

SNS COLLEGE OF ALLIED HEALTH SCIENCE
Affiliated to The Tamil Nadu Dr MGR Medical University, Chennai



DEPARTMENT OF CARDIAC TECHNOLOGY

COURSE NAME : Advanced Electrocardiography

UNIT : Basics Of Variants ECG

TOPIC : Left and Right Hypertrophy & Enlargement

FACULTY NAME: Kavipriya S

Case scenario - Left & Right Ventricular Hypertrophy and Enlargement

Case Scenario:

- **Patient:** 58-year-old male
- **Symptoms:** Exertional dyspnoea, fatigue, occasional chest tightness
- **History:** Long-standing hypertension (10 years), mild breathlessness for 6 months



Empathize (Understanding the Problem)

Objective: Gather clinical, diagnostic, and emotional insights from the patient's experience.

Patient Symptoms:

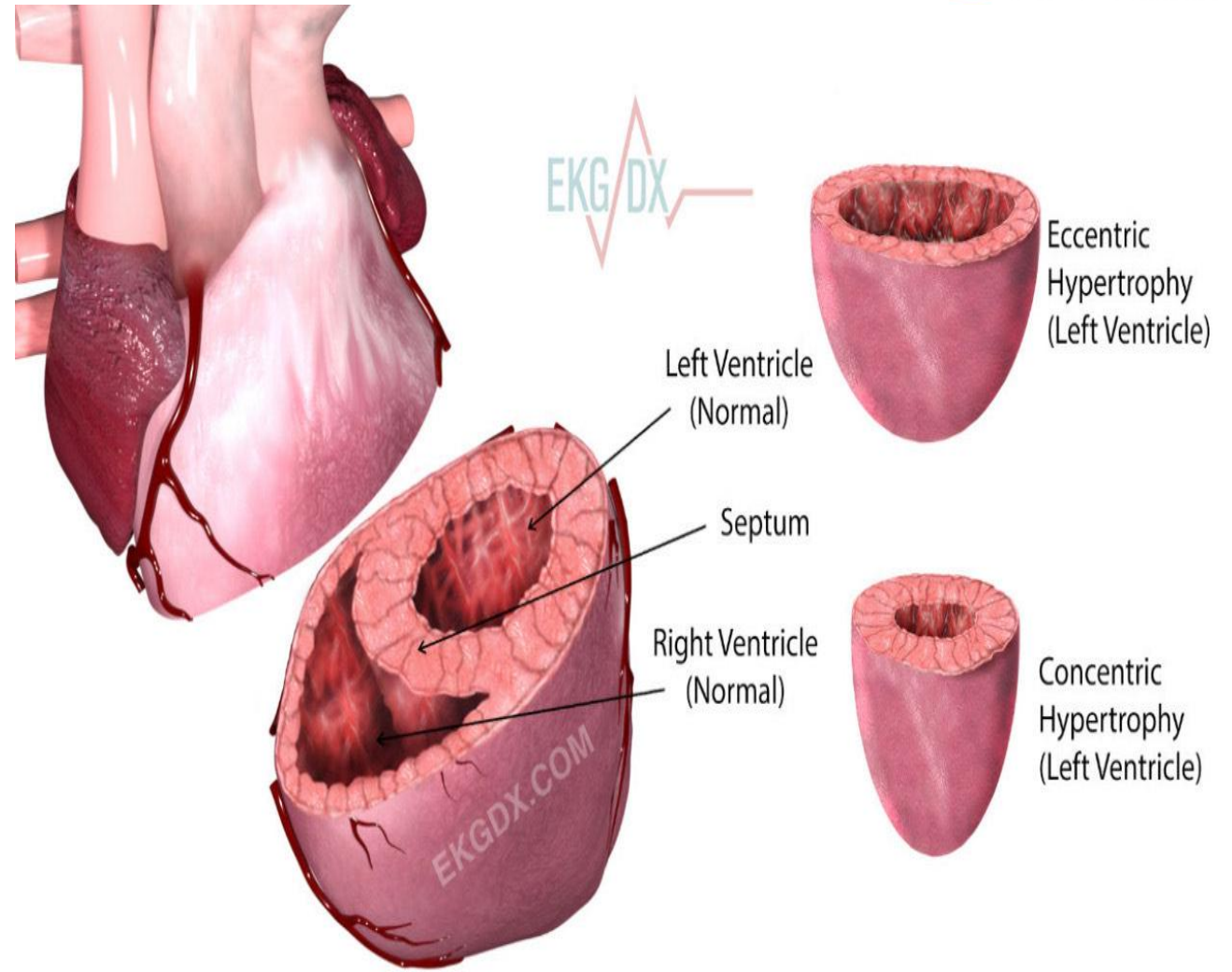
- Feels “tired easily” and “heart pounding” after minimal exertion.
- Concerned about progressive shortness of breath.



Empathize

Clinical Observation:

- Suspects **Left Ventricular Hypertrophy (LVH)** due to long-term hypertension.
- Needs to rule out secondary causes and assess cardiac function.

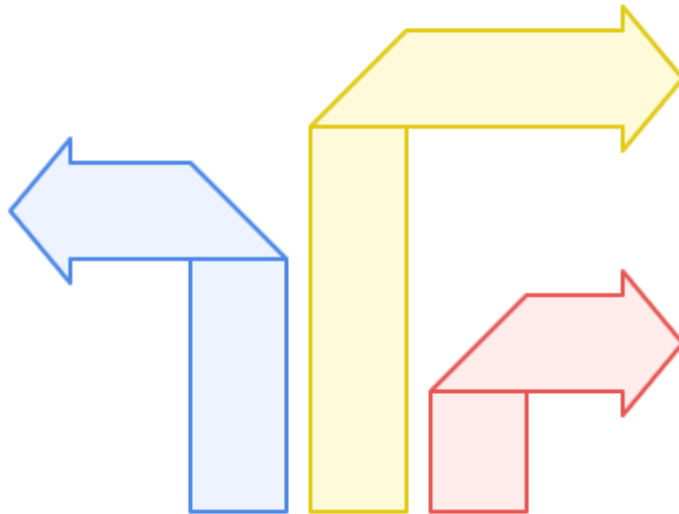


DEFINE – Problem Identification & Diagnostic Goal

Clinical Problems:

Functional Problem

Impaired relaxation or contraction suggests functional issues.

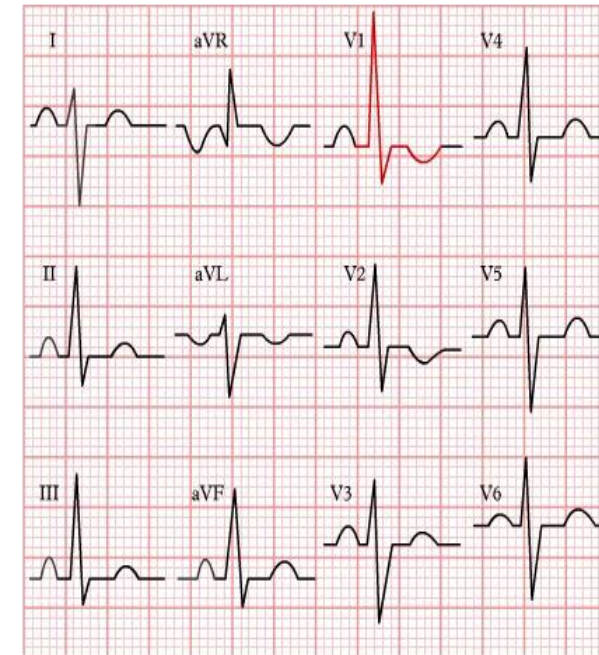
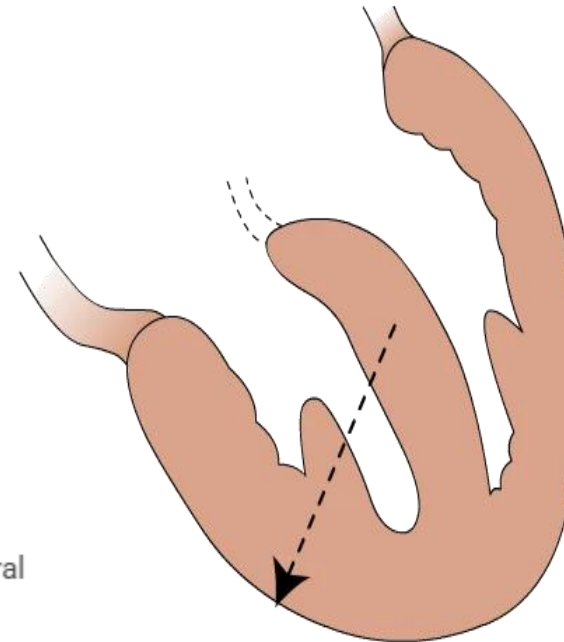


Electrical Problem

Abnormal ECG patterns suggest electrical issues.

Structural Problem

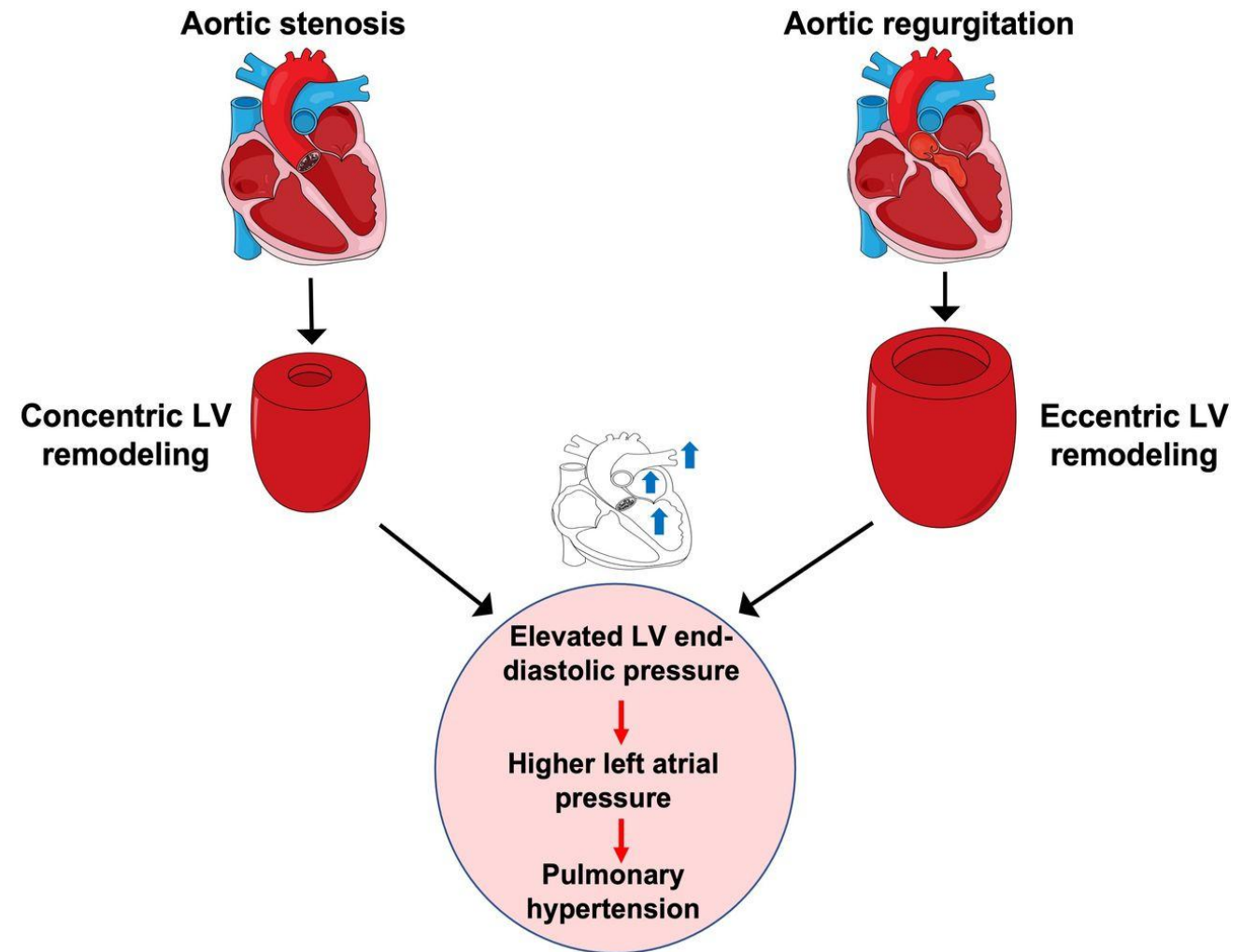
Thickened ventricular wall indicates structural issues.



Define

Diagnostic Goal:

- Confirm hypertrophy (anatomically and functionally)
- Identify **underlying cause** (e.g., hypertension, valvular disease, pulmonary hypertension)
- Assess **hemodynamic impact** and **risk of progression**

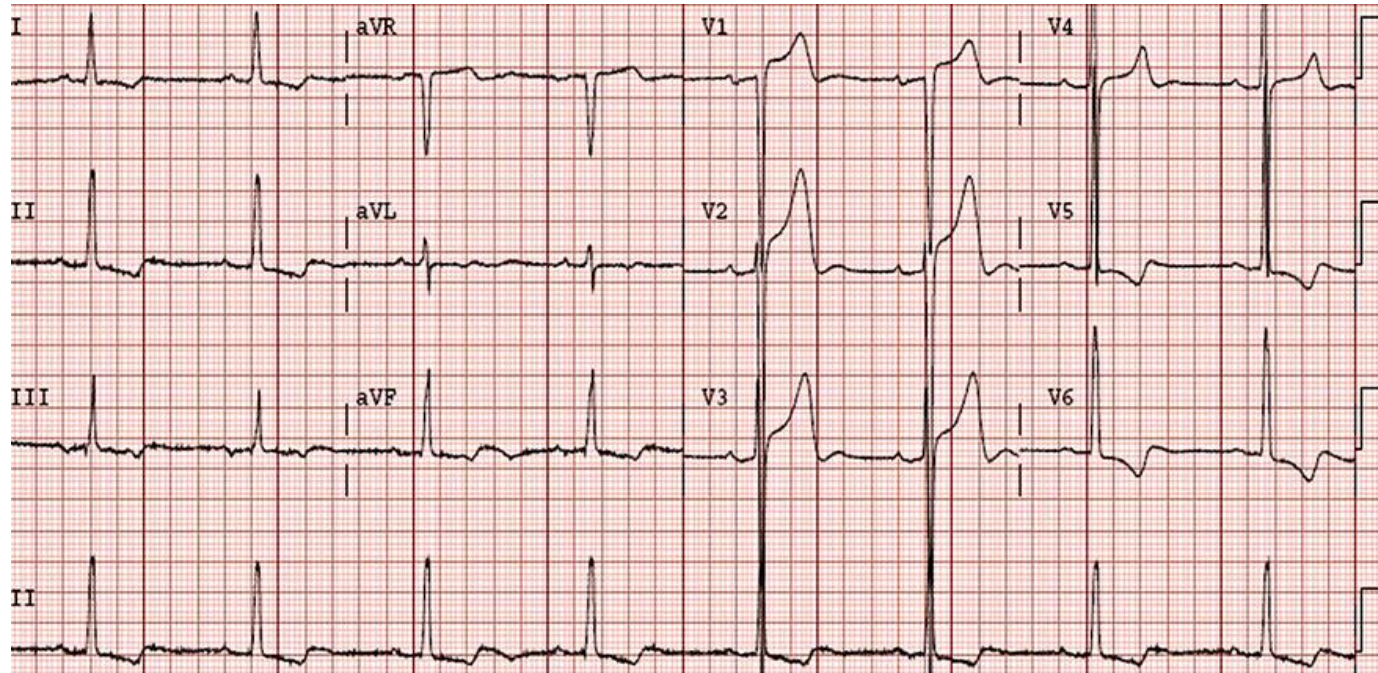


IDEATE – Diagnostic & Investigative Strategies

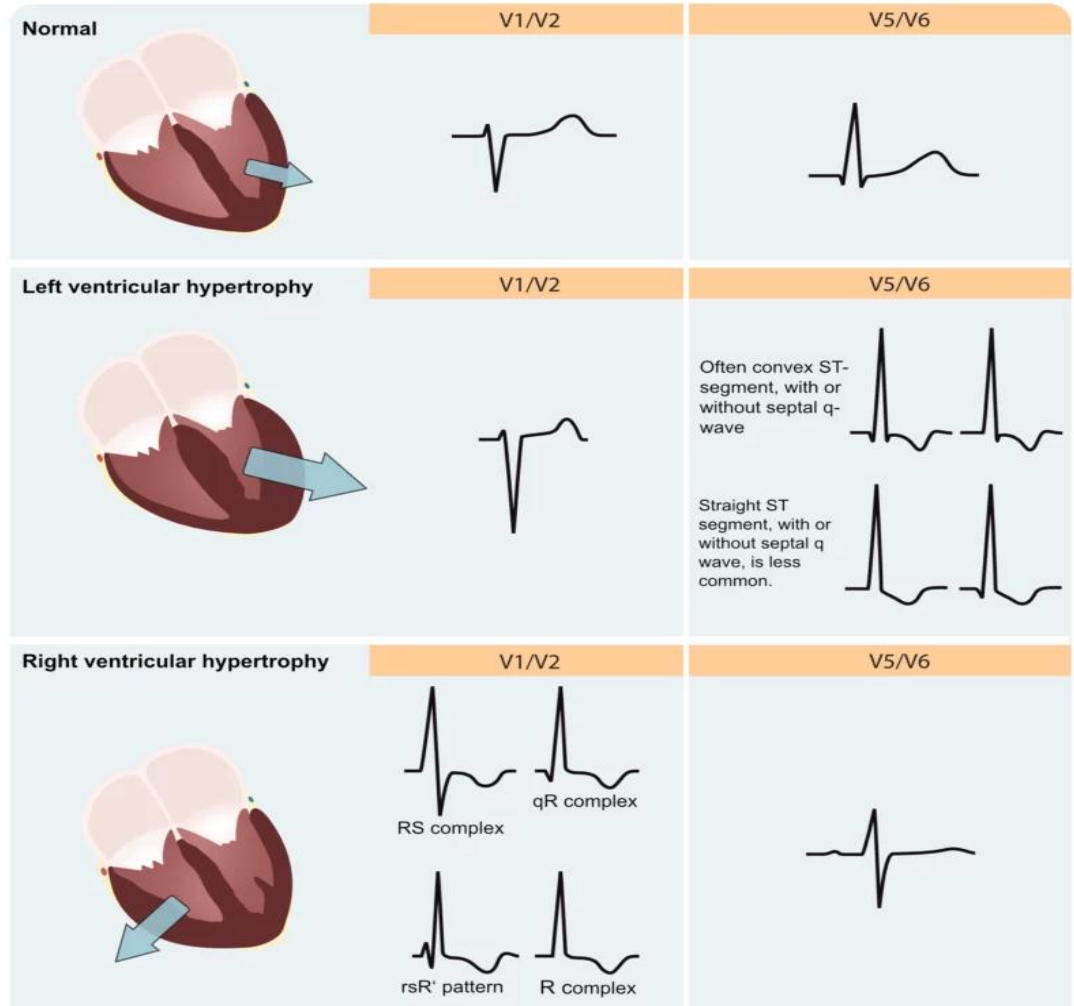
For Left Ventricular Hypertrophy (LVH):

ECG findings:

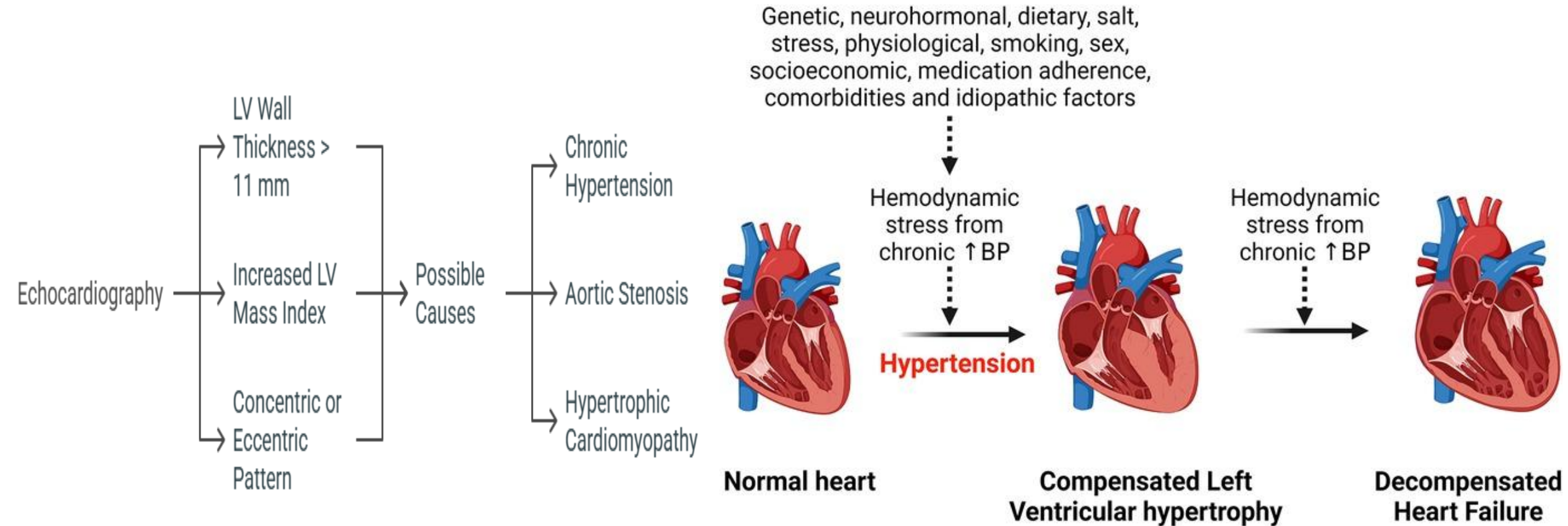
- Increased R-wave amplitude in V5–V6
- Deep S wave in V1–V2
- Left axis deviation
- ST-T strain pattern (secondary repolarization changes)



Ventricular hypertrophy is seen in leads V1, V2, V5 and V6.



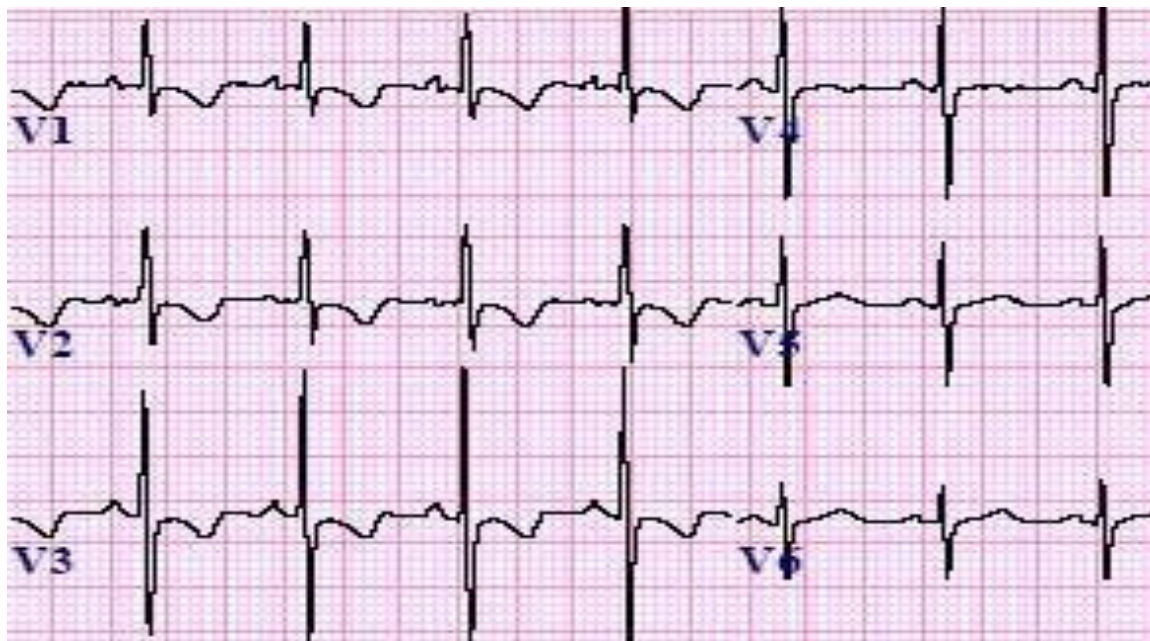
Echo Assessment



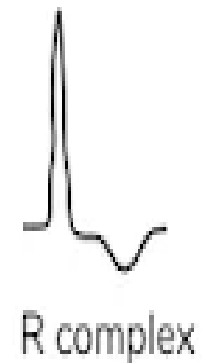
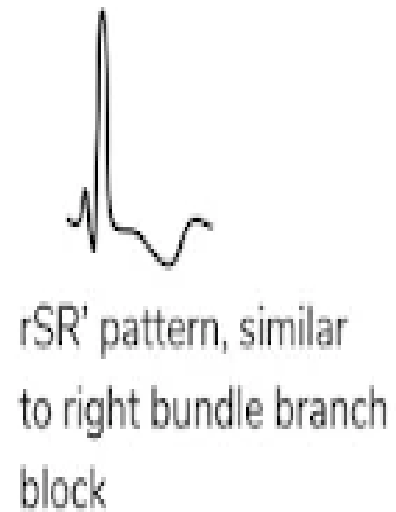
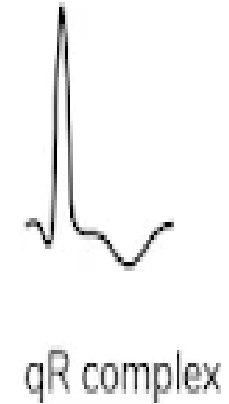
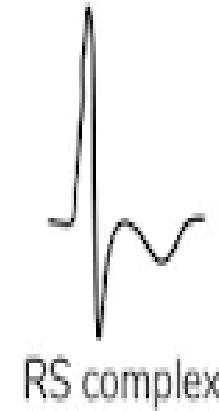
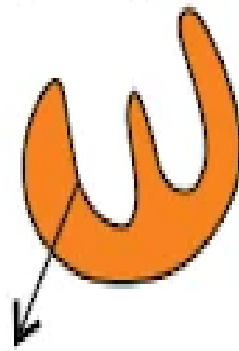
Right Ventricular Hypertrophy (RVH):

ECG findings:

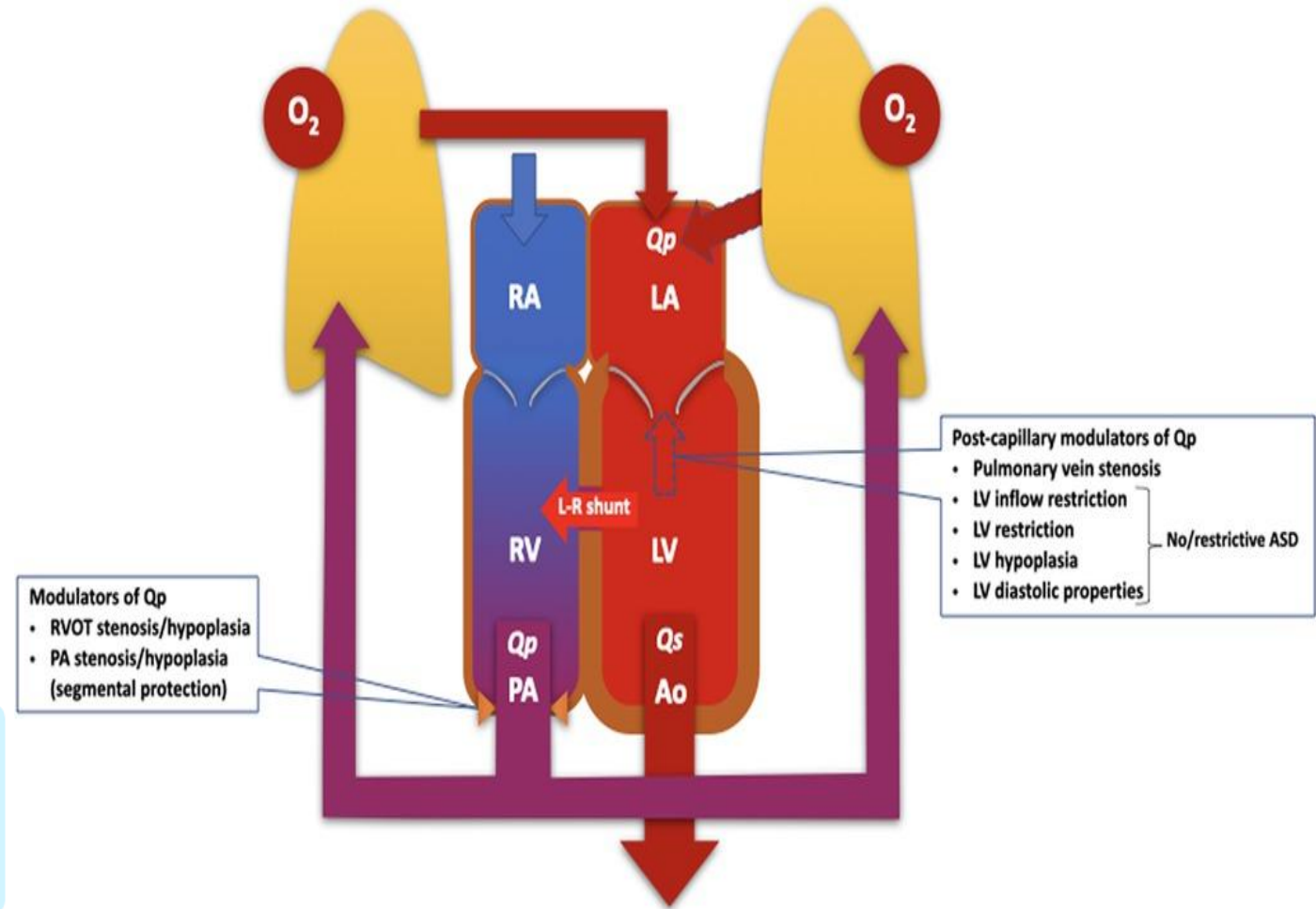
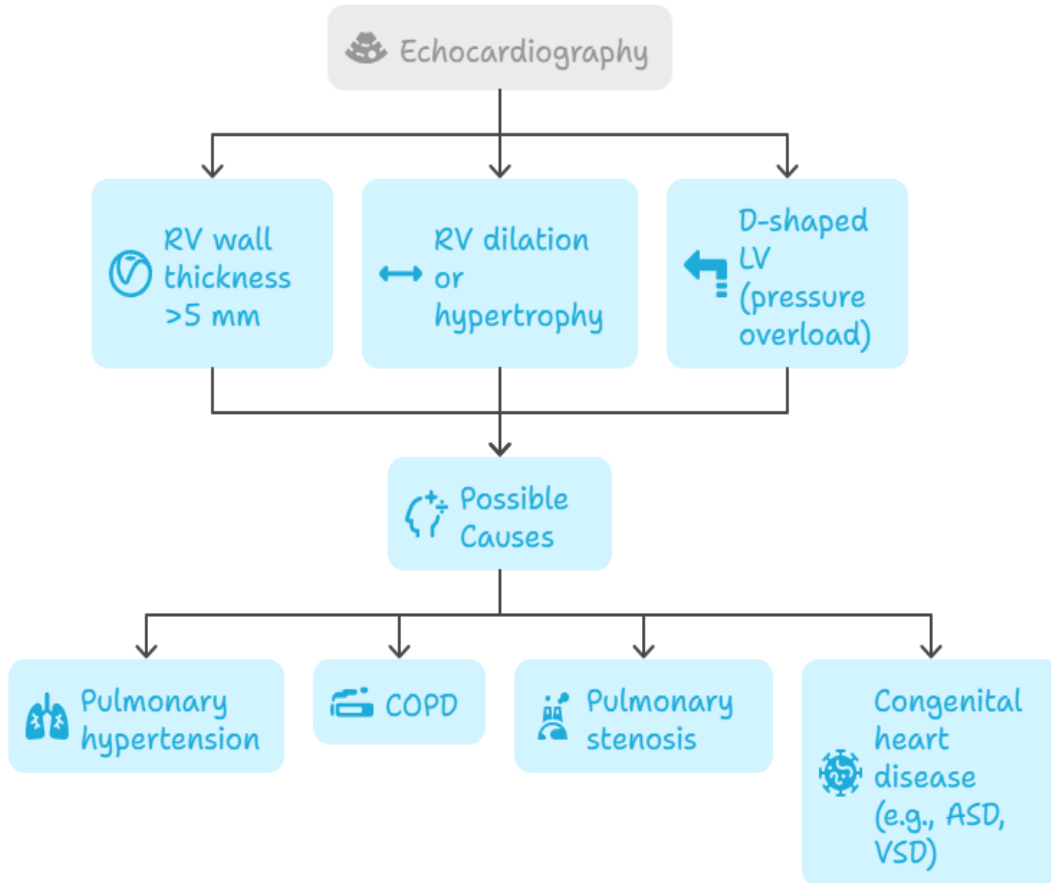
- Right axis deviation ($>110^\circ$)
- Tall R waves in V1
- Dominant S waves in V5–V6
- T wave inversion in V1–V3



Right ventricular hypertrophy



Echo Assessment



PROTOTYPE – Clinical Management & Intervention Plan-LVH

Heart Health Guidance

Aortic Stenosis Management

Treatment approaches for aortic stenosis

Lifestyle Modifications

Lifestyle changes for heart health

Blood Pressure Control

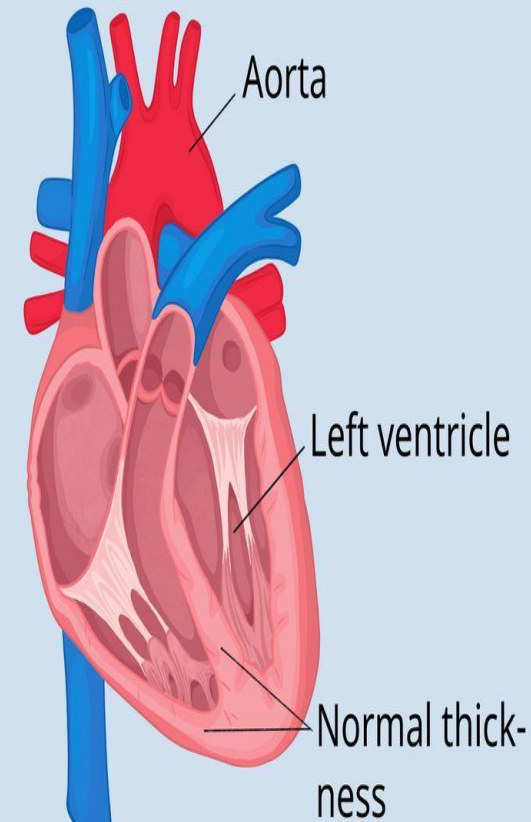
Medication options for blood pressure management

LV Mass Monitoring

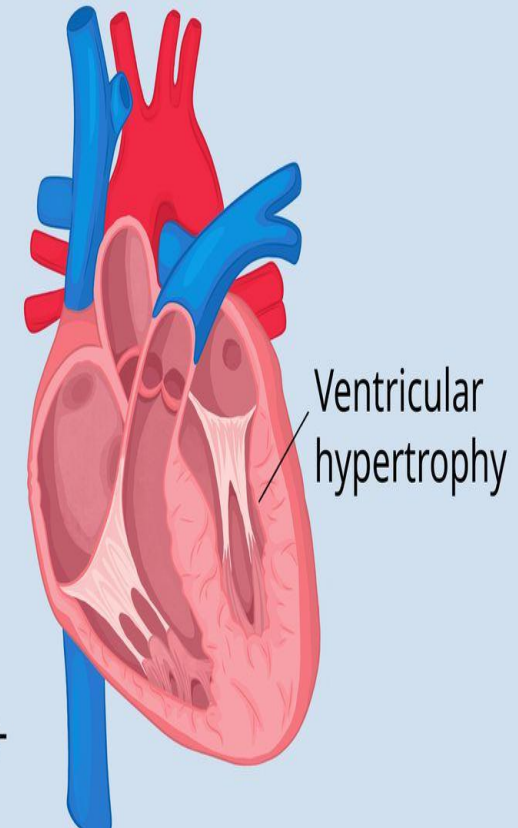
Monitoring heart muscle size



Normal Anatomy



Left Ventricular Hypertrophy



PROTOTYPE – Clinical Management & Intervention Plan-RVH

Comprehensive Pulmonary Care

Underlying Cause Treatment

Addressing the root cause of pulmonary issues

Right Heart Function Monitoring

Keeping track of the heart's right side performance

Pulmonary Hypertension Management

Controlling high blood pressure in the lungs

Lifestyle Adjustments

Implementing dietary and fluid control measures



Normal heart



ventricle wall

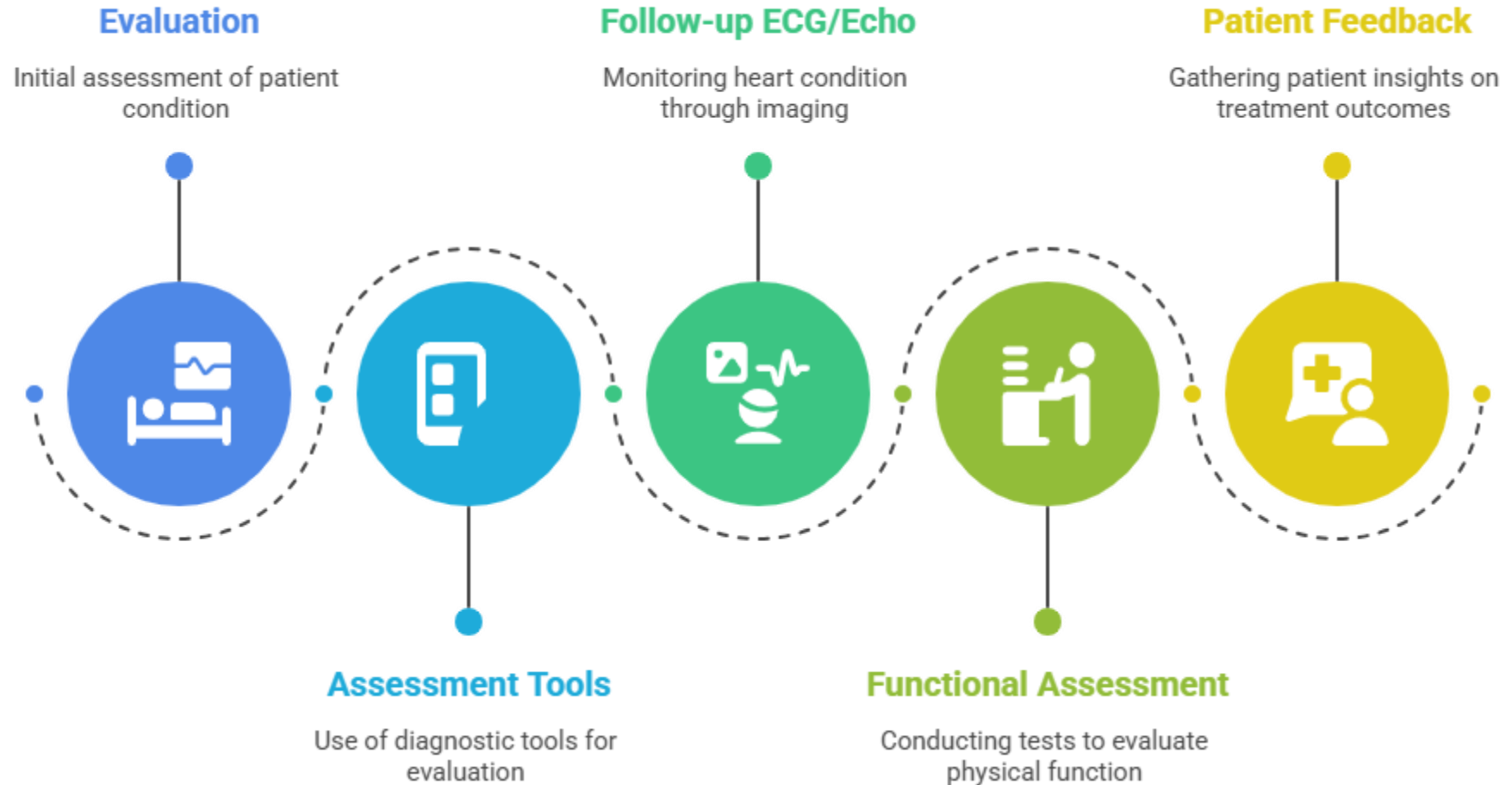
Right Ventricular hypertrophy



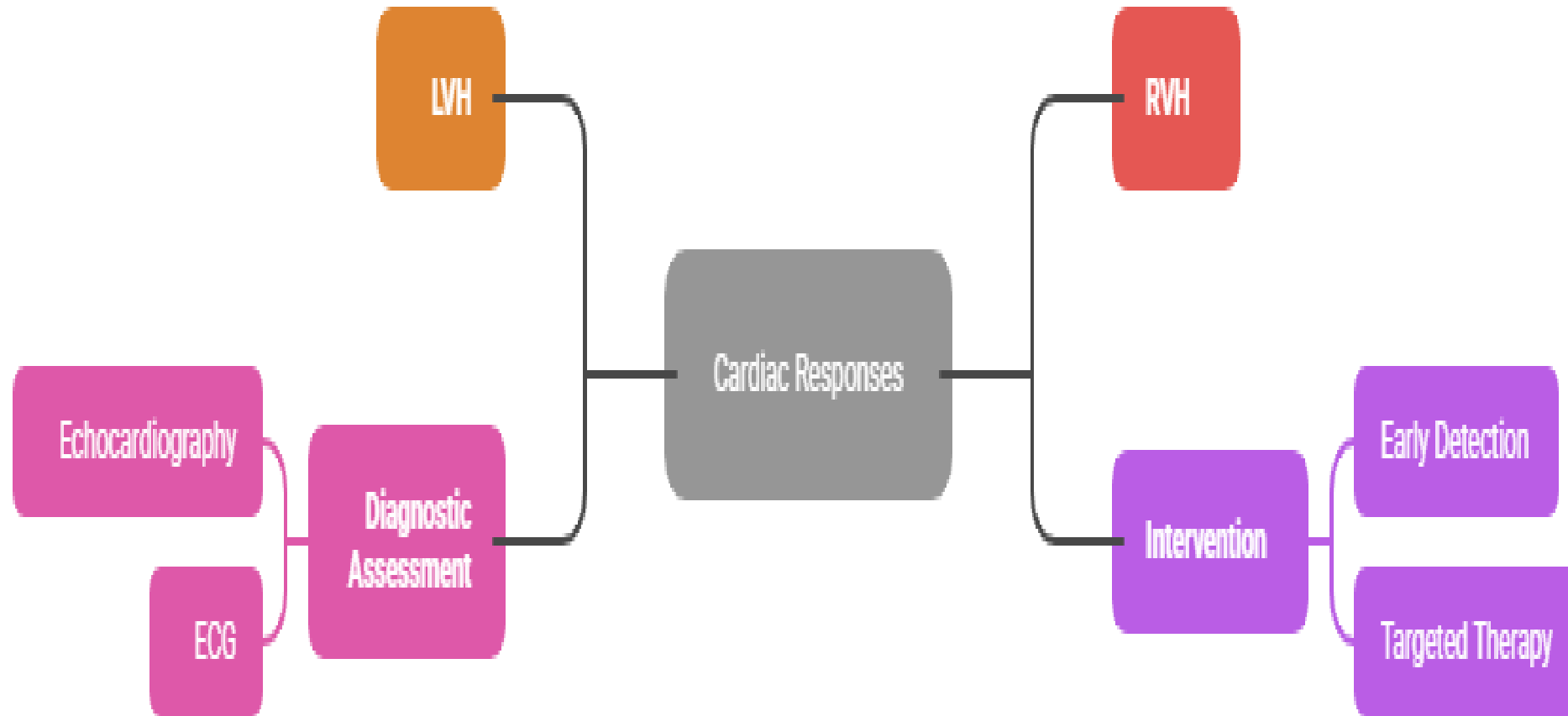
TEST – Evaluation, Feedback & Follow-up

Outcome Indicators:

- Reduction in ventricular wall thickness
- Normalization of ECG patterns
- Improved cardiac output
- Controlled blood pressure and pulmonary pressures



Summary



Reference



- *Cardiac Left Ventricular Hypertrophy*. (editor unknown) Springer. 2013 (?) ISBN: 978-94-009-6759-5. [SpringerLink](#)
- Focuses more specifically on left ventricular hypertrophy (LVH).
- Useful for structural, imaging, clinical aspects.
- Gertsch M. “Right Ventricular Hypertrophy.” In: *The ECG Manual*. Springer, xxxx. pp 59-66. (Chapter) [SpringerLink](#)
- Good short book chapter specifically for RVH. Useful for ECG correlation in RV enlargement/hypertrophy.